US 20170117992A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2017/0117992 A1**

Frederiksen et al. (43) **Pub. Date: Apr. 27, 2017**

(54) **HYBRID AUTOMATIC REPEAT REQUEST TIMING IN COMMUNICATIONS**

(71) Applicant: **Nokia Solutions and Networks Oy**, Espoo (FI)

(72) Inventors: **Frank Frederiksen**, Aalborg (DK); **Esa Tapani Tiirola**, Kempele (FI)

(73) Assignee: **Nokia Solutions and Networks Oy**, Espoo (FI)

(21) Appl. No.: **15/301,704**

(22) PCT Filed: **Apr. 4, 2014**

(86) PCT No.: **PCT/EP2014/056776**

§ 371 (c)(1),
(2) Date: **Oct. 3, 2016**

Publication Classification

(51) **Int. Cl.**
H04L 1/18 (2006.01)
H04W 72/12 (2006.01)

(52) **U.S. Cl.**
CPC ***H04L 1/1887*** (2013.01); ***H04L 1/1896*** (2013.01); ***H04W 72/1284*** (2013.01); ***H04L 1/1812*** (2013.01)

(57) **ABSTRACT**

A method is disclosed comprising defining a hybrid automatic repeat request HARQ profile for a user terminal among a plurality of HARQ profiles available. In an embodiment, the HARQ profile indicates a first time interval between downlink transmission being received in the terminal and corresponding uplink control information being expected to be transmitted from the terminal, and a second time interval between the uplink control information being transmitted from the terminal and corresponding downlink retransmission at earliest being expected to be received in the terminal. In another embodiment, the HARQ profile indicates a third time interval between uplink transmission being received in a base station and corresponding downlink information being expected to be transmitted from the base station, and a fourth time interval between the downlink information being transmitted from the base station and corresponding uplink retransmission at earliest being expected to be received in the base station.